CHANGES IN CLADOCERAN ASSEMBLAGES FROM A SMALL ARCTIC LAKE (NENETS AUTONOMOUS OKRUG, RUSSIA)

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Arctic and subarctic regions have been of considerable interest to researchers during the recent years. It is widely accepted that high-latitude regions play an essential role in climate forcing and may be particularly sensitive to climate change. Climate change and active development of the Far North territories have already lead to negative consequences by disturbing a fragile balance of northern ecosystems, which are known as the systems with a low degree of resistance to anthropogenic influence and an extremely low rate of restoration.

Cladocera (Branchiopoda: Crustacea) is the key component of aquatic ecosystems.They are commonly used in paleoecological reconstructions of climatic and environmental change. Their chitinous exoskeletal components (shell, head shield, postabdomen, postabdominal claws, antennal segments, and mandibles) are usually well preserved after death in lake sediments. Furthermore, most of them are identifiable to the species level. Ecological data have been obtained for most cladoceran species. It has been proved that they are sensitive to changes in climate and environmental variables, such as trophic state, electric conductivity, salinity disturbances, and predation intensity (Jeppesen et al, 2003; Frolova et al. 2016). The aim of the present investigation was to analyze the taxonomic and ecological diversity of cladoceran microfossil assemblages from a lake in the catchment area of the Pechora delta (Northeast Europe, Russia).

The lake 11-Pe-03 (68°11′30.8″N, 53°47′36.2″E) has a thermokarst origin. The lake is characterized by low electric conductivity, pH 7.2, and prevalence of bicarbonate-calcium water composition. The greatest depth (2.0 m) was recorded in the southern part of the lake, but the average depth is 1-1.5 m. One core (11-Pe-03A, 48-cm long) was used for analysis of subfossil cladoceran remains. The sediment samples for cladoceran analysis were studied using the standard techniques described in Szeroczyńska and Sarmaja-Korjonen (2007).

A 0.5 g subsample was placed in a ceramic crucible and heated at 1100˚C for 2 h to determine the loss on ignition (LOI).The structure of bottom sediments is characterized by an increase in the proportion of organic material (LOI). The LOI varies between 0.9 and 2.9% at the beginning of the stratigraphy and increases constantly to approximately 30.2-32.8% towards the surface sediment.

The species distribution of cladoceran remains in recent sediment layers was similar to that observed in contemporary water samples. The cladoceran assemblages were quite rich and diverse in speciesfor all studied lakes, including the lake 11-Pe-03, with relatively stable structures. A total of 27 cladoceran taxa, of which 21 taxa are in the family Chydoridae, were identified from the core 17-Pe-03. The most common cladoceran taxa were as follows: *Chydorus sphaericus*, *Alona guttata / Coronatella rectangula,* and *Bosmina (Eubosmina) longispina* (all had the occurrence frequency of 100%). The bottom part of the core is characterized by the dominance of cold-water pelagic taxa (*Bosmina (Eubosmina) longispina*, and *Chydorus sphaericus*s.l.) and small taxa of the genus *Alona*. The obtained data show considerable changes in cladoceran assemblages along the studied core. The most common taxa at the top of the core are *Chydorus sphaericus*s.l., *Pleuroxus uncinatus,* and *Alonella nana*, all increased significantly in number towards the top of the core. The observed changes in the cladoceran fauna reflect an increase in the trophicity of the lake 17-Pe-03. The dominance of the cladoceran *Chydorus sphaericuss.l.*, the species associated with high nutrient status, suggests that the lake had elevated productivity. This is also indicated by the presence of *Pleuroxus uncinatus*, *Alonella nana,* and *Disparalona rostrata*, because these taxa occur mostly in mesoeutrophic localities, as well as by the high number of cladocerans and the high organic content of the sediment.

The field work was supported by the Russian Science Foundation (project no.16-17-10118). The analysis of subfossil cladocerans, interregional comparison, and interpretation of the results was supported by the Russian Foundation for Basic Research (project no. 18-05-00406 A).

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RECONSTRUCTION OF THE POST-GLACIAL ENVIRONMENTAL VARIATIONS BASED ON THE MULTI-PROXY APPROACH: DŪKŠTELIS LAKE, EASTERN LITHUANIA

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Though numerous lithological, palaeobotanical and chronological investigations were carried out across the territory of Lithuania revealing environmental variations during the Lateglacial and Holocene, not so much is known about the changes of the sedimentological regime of the basins that has been directly determinate by the climatic fluctuations, surface dynamic, anthropogenic impact and etc. Deglaciated during the earliest stages of the Lateglacial, the Eastern part of the Lithuania serves as a promising area for the evaluation of the above mentioned fluctuations.

Here we briefly present results of the detailed interdisciplinary approach, involving geological techniques, applied to investigate post-glacial sedimentological changes of the Dūkštelis basin situated in the Eastern Lithuania (54° 50’ 10”N, 25° 9’ 59”E). The investigated site is located in the marginal area of the Last Glacial Maximum, surrounded by the formations of the South Lithuanian Phase, within the hummocky moraine zone. From the North boggy area borders with end moraine and glaciolimnic sediments are located southwards. In order to reconstruct the post-glacial geological-geomorphological development of the surroundings of Dūkštelis site, a set of black-white stereoscopic aerial photos (scale 1:17 000; 1952) has been interpreted. Alongside with this, the area was also digitalized applying the digital reconstruction model LIDAR (Guobytė and Rimkute, 2013). Obtained data suggested that Dūkštelis Lake was one of a few in the lake system that existed in area during the Lateglacial. Since the onset of the Holocene the size of the water bodies decreased by around 85%.

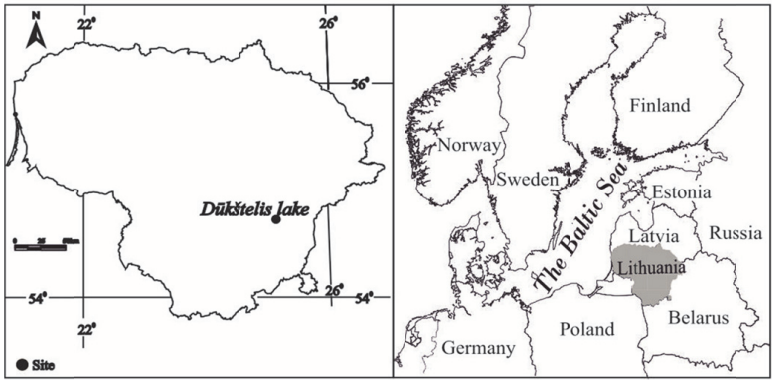

Fig. 1. Location of the study area